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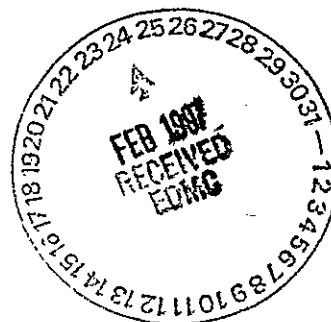
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Rev. 1

200-ZP-1 Pump-and-Treat System Operating Procedure

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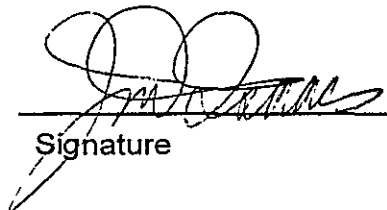
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OPERATING PROCEDURE

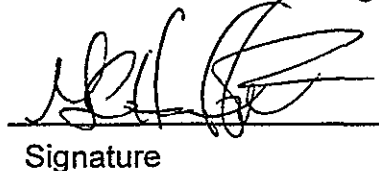
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200-ZP-1 PUMP-AND-TREAT SYSTEM OPERATING
PROCEDURE

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*This is a complete rewrite; therefore, no revision bars are used to indicate changes.

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1.0 INTRODUCTION

This procedure provides the operating instructions and guidelines for the 200-ZP-1 pump-and-treat system. The 200-ZP-1 system extracts ground water from the aquifer underlying the ZP-1 operable unit; uses air to strip the ground water of carbon tetrachloride, trichloroethylene, and chloroform; then reinjects the ground water into the aquifer. These compounds are termed as volatile organic compounds (VOCs). Granulated activated charcoal (GAC) canisters adsorb the VOCs from the stripping air; the charcoal is removed and reactivated in offsite furnaces.

Operators start the system manually; thereafter, a programmable logic controller (PLC) enforces control and shutdown signals automatically. Because the control system facilitates continuous, automatic operation, operator intervention is minimized. The PLC alarms remotely to prompt operator response and troubleshooting.

The pump-and-treat system consists of the following major equipment:

- Three extraction wells with corresponding well pumps [WE01(2)(3) and PE01(2)(3), respectively] and an extraction manifold building
- Influent tank T01, influent pump PT01, and influent cartridge filter F-1A.
- Stripper V01, stripper transfer pump PT03, and air blower B01
- Effluent/injection tank T02, injection pump PI01, and injection cartridge filter F-2A(2B)
- Injection manifold building and Injection well INJ01
- Chiller C01 and heater H01
- Three sets of series-installed GAC canisters (V02A and V03A; V02B and V03B; V02C and V03C)
- Pump-and-treat building sump-pump PT02
- Stripper pad sump-pump PT04

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Extraction well pumps PE01(2)(3) extract contaminated groundwater from the aquifer and pump the water to influent tank T01. Influent pump PT01 pumps the water from tank T01, through cartridge filter F-1A, to a spray nozzle located inside the top of stripper V01. Simultaneously, blower B01 injects air into the stripper's bottom section. Water sprays down through a bed of specially designed packing that is contained within V01. Air flowing up through the packing strips the carbon tetrachloride (and its degradation products) from the water. Packing design facilitates a stripping action.

The air, containing stripped contaminants, exits the top of V01 and passes through chiller-heater C01/H01. C01 condenses and removes moisture from the air, and H-01 lowers the relative humidity of the air. Chiller pump P-05 discharges condensate to T01, while dried air flows through two sets of primary and polishing GAC canisters. The GAC adsorbs contaminants; cleaned air is then normally vented to the outside atmosphere (or is alternatively routed to blower B01 suction).

The stripped water is pumped from stripper V01 basin to effluent/injection tank T02. Injection pump PI01 pumps the water from effluent/injection tank T02, through cartridge filter F-2A(2B), to injection well INJ01.

2.0 PURPOSE

This procedure provides instructions for the normal system startup, shutdown and manual modes of 200-ZP-1 operation.

3.0 SCOPE

This procedure encompasses the operation of the 200-ZP-1 (Phase II) pump-and-treat system and associated extraction and injection wells.

4.0 PREREQUISITES

1. ATTACHMENT 1, the 200-ZP-1 valve checklist shall be completed prior to initial operation and after any substantial or lengthy shutdown.
2. ATTACHMENT 2, the 200-ZP-1 power supply checklist shall be completed prior to initial operation and after any substantial or lengthy shutdown.

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5.0 PRECAUTIONS

1. Do not operate the blower or any pump for more than two minutes at no-flow (shutoff head) to prevent thermal damage, or over-pressurization of system piping.
2. Process waste must be handled in accordance with BHI-00978, *Site Specific Waste Management Instruction, 200-ZP-1 Pump and Treat System*.
3. Do not operate heater H01 without airflow to preclude damaging heater coils.
4. The 200-ZP-1 system is designed to remove carbon tetrachloride and its degradation products, trichloroethylene, and chloroform. The associated safety precautions shall be observed in accordance with BHI-00826, *200-ZP-1 Phase II and III IRM Groundwater Pump and Treat Site Safety Plan*.
5. The pump for extraction well #3 (PE03) does not have a check valve. Backflow should not exist prior to pump start to prevent associated overload trips.
6. Immediately report any system leakage to your supervisor.
7. Strictly observe the safe operating practice of opening and closing system valves SLOWLY to minimize pressure transients.
8. The PLC program contains a 10 minute shutdown timer that will stop the system if all of the following is **NOT** satisfied within 10 minutes of starting the first well pump:
 - Blower B01 running
 - Influent pump PT01 running greater than 100 gpm
 - Stripper transfer pump running
 - Injection pump PI01 running
 - One well pump (PE01, 02 or 03) running

6.0 STANDARD OPERATING PROCEDURES

6.1 System Startup

CAUTION

The 200-ZP-1 system is designed to remove carbon tetrachloride and its degradation products, trichloroethylene and chloroform. Observe associated safety precautions in accordance with BHI-00826.

Discussion:

This portion of the operating procedure assumes that tank levels are near their normal operating setpoints and the system is being restarted after a normal, controlled shutdown.

Any alarm condition will initiate a yellow flashing light, located inside the 200-ZP-1 process building, and a horn, located on the main control panel. Tables 7-1, 7-2 and 7-3 list the automatic trips and alarm response procedures.

- 6.1.1** Check that the following hand switches at the main control panel (MCP) are **OFF** and the applicable hand switches at MCC-1 are in **AUTO**:
- a. Stripper transfer pump PT03
 - b. Blower B01
 - c. Extraction well pump PE01
 - d. Extraction well pump PE02
 - e. Extraction well pump PE03
- 6.1.2** Check that the following hand switches at the main control panel (MCP) are **OFF** and the applicable hand switches at AFD-PT-01 and AFD-PI-01 panels are in **REMOTE**.
- a. Influent pump PT01
 - b. Injection pump PI01
- 6.1.3** Check that the following valve control switches at the MCP are as follows:

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- | | |
|---------------------------------|-----------------------------|
| a. Extraction well #1 FCV-E01: | AUTO |
| b. Extraction well #2 FCV-E02: | AUTO |
| c. Extraction well #3 FCV-E03: | AUTO |
| d. Gas analyzer HS-SV02A(B)(C): | AUTO (2 of 3 GAC Canisters) |
| e. Gas analyzer HS-SV03A(B)(C): | AUTO (2 of 3 GAC Canisters) |
| f. Gas analyzer HS-SVH01: | AUTO |
| g. Gas analyzer HS-SVAE: | AUTO |

NOTE: To change a Honeywell process controller from AUTO to MANUAL: Push the MANUAL/AUTO button on the face of the controller until "MAN" is displayed. The word OUTPUT will be displayed as well as the output value. Increase or decrease output with the UP and DOWN arrows.

6.1.4 Check/set the Honeywell process controllers on the MCP at the following values:

- | | | |
|------------------------------------|--------|------------|
| a. Influent tank LIC-T01 | MANUAL | 50 percent |
| b. Influent pump FIC-TSL02 | AUTO | 150 (gpm) |
| c. Stripper LIC-V01 | MANUAL | 50 percent |
| d. Effluent/Injection tank LIC-T02 | MANUAL | 40 percent |

6.1.5 Move chiller C01 local breaker to **ON**.

6.1.6 **OPEN** Injection valve 6 in. I01-V11.

CAUTION

The PLC system shutdown timer will shutdown the system if the startup is not completed within 10 minutes.

CAUTION

The pump for extraction well #3 (PE03) does not have a check valve. PE03 should be started first to prevent backflow and possible overload trip.

6.1.7 Start extraction well pumps PE03 (PE01, PE02) at the MCP as follows:

- a. **OPEN** FCV-E03 (E01, E02) by turning and holding its hand switch to **ON**.

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- b. When FCV-E03 (E01, E02) position indicating lights shows the valve OPEN, start PE03 (PE01, PE02) by turning its hand switch to **ON**.
- c. When PE03 (PE01, PE02) starts, **RELEASE** the pump and valve hand switches (spring return to AUTO).

CAUTION

Do not operate the blower or any pump for more than two minutes at no-flow (shutoff head) to prevent thermal damage, or overpressurization of system piping.

- 6.1.8 Start blower B01 at the MCP (HS is moved to **ON** and HOLD until the low pressure alarm can be reset - approximately five seconds, THEN release HS).

NOTE: Starting PT01 opens its FCV-TSL02 automatically.

- 6.1.9 Start influent pump PT01 at the MCP (HS moved to **ON**). Observe increasing water level in V01.

- 6.1.10 Start PT03 at the MCP (HS moved to **ON**). Observe increasing water level in effluent/injection tank T02.

NOTE: Starting PI01 opens its LCV-I01 automatically.

- 6.1.11 Start injection pump PI01 at the MCP (HS moved to **ON**).

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NOTE: To change a Honeywell process controller from MANUAL to AUTO: Push the MANUAL/AUTO button on the face of the controller until "A" is displayed. The letters SP will be displayed as well as the setpoint value. If the output value display is desired, press the LOWER DISPLAY button twice until the word OUTPUT and the output value are displayed.

- 6.1.12 With controller LIC-T01 in manual, use the **UP** and **DOWN** arrow pushbuttons to adjust output of LIC-T01 as required to adjust Influent Tank T01 level. When level is near 100 inches, place LIC-T01 in **AUTO**.
- 6.1.13 With controller LIC-V01 in manual, use the **UP** and **DOWN** arrow pushbuttons to adjust output of LIC-V01 as required to adjust Stripper V01 level. When level is near 56 inches, place LIC-V01 in **AUTO**.
- 6.1.14 With controller LIC-T02 in manual, use the **UP** and **DOWN** arrow pushbuttons to adjust output of LIC-T02 as required to adjust Effluent/Injection Tank T02 level. When effluent/Injection Tank T02 level is near 100 inches, Place LIC-T02 in **AUTO**.
- 6.1.15 Monitor system parameters and observe that system has no discernable leakage.

6.2 System Shutdown

- 6.2.1 Stop PT01, PT03, PI01 and PE03 (01, 02) by placing their associated hand switches in **OFF**.
- 6.2.2 Allow B01 to run until it is stopped by the PLC (approximately 10 minutes). Then place B01 HS in **OFF**.
- 6.2.3 Move chiller C01 local breaker to **OFF**.
- 6.2.4 **CLOSE** injection valve 6 in. I01-V11 (to prevent siphoning of Tank T02) .
- 6.2.5 Acknowledge Alarms.

6.3 Manual System Operation

Discussion:

Various conditions may necessitate operating the entire system or portions of the system in manual. As stated in Section 5.0, item 8, the PLC system

shutdown timer will shutdown the system if all of the stated conditions are not met. When in manual, PLC control and stop functions are bypassed.

CAUTION

Full time operator surveillance is required while performing manual operations.

6.3.1 Recirculation

Discussion:

System recirculation may be required to reduce the Carbon Tetrachloride level of the water in effluent/injection tank T02. This section of the procedure assumes the system is not running when the decision to begin recirculation is made.

- a. **OPEN** recirculation valves 6 in.-TSL04-V01, 6 in.-TSL04-V02 and 6 in.-TSL04-V03.
- b. **CLOSE** injection valve 6 in. I01-V11.
- c. At MCC-1, **START** blower B01 by moving handswitch from **AUTO** to **HAND**.
- d. At MCC-1, **START** stripper transfer pump PT03 by moving handswitch from **AUTO** to **HAND**.

NOTE: Starting PT01 opens its FCV-TSL02 automatically.

- e. At AFD-PT01:
 - 1) **START** influent pump PT01 by moving handswitch from **REMOTE** to **LOCAL**.
 - 2) Push **START** pushbutton.
 - 3) Using the **UP** and **DOWN** arrows on the local controller, increase speed of PT01 until flow displayed on FIC-TSL02 is 150 gpm.

NOTE: Starting PI01 opens its LCV-I01 automatically.

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- f. At AFD-PI01:
 - 1) **START** injection pump PI01 by moving handswitch from **REMOTE** to **LOCAL**.
 - 2) Push **START** pushbutton.
 - 3) Using the **UP** and **DOWN** arrows on the local controller, increase speed of PI01 until flow displayed on FI-TSL01 is 150 gpm.
- g. Acknowledge Alarms.

6.3.2 Shutdown from Recirculation

- a. At MCC-1, move stripper transfer pump handswitch to **OFF** then **AUTO**.
- b. At AFD-PT01:
 - 1) Using the **DOWN** arrow on the local controller, decrease speed of PT01 to zero.
 - 2) Push **STOP** pushbutton.
 - 3) Move influent pump PT01 handswitch from **LOCAL** to **REMOTE**.
- c. At AFD-PI01:
 - 1) Using the **DOWN** arrow on the local controller, decrease speed of PI01 to zero.
 - 2) Push **STOP** pushbutton.
 - 3) Move Injection pump PI01 handswitch from **LOCAL** to **REMOTE**.
- d. Ten minutes after PT01 has been stopped, at MCC-1, move blower B01 handswitch to **OFF** then **AUTO**.
- e. **CLOSE** recirculation valves 6 in.-TSL04-V01, 6 in.-TSL04-V02 and 6 in.-TSL04-V03.
- f. At the MCP, place handswitches for PT01, B01, PT03 and PI01 in **OFF**.

6.3.3 Fill Influent Tank T01

CAUTION

The pump for extraction well #3 (PE03) does not have a check valve. PE03 should be started first to prevent backflow and possible overload trip.

- a. Start extraction well pump PE03 (PE01, PE02) as follows:
 - 1) At MCC-1 place PE03 (PE01, PE02) handswitch in **HAND**.
 - 2) The associated valve FCV-E03 (E01, E02) will open.
- b. When influent tank T01 is filled to desired level:
 - 1) At MCC-1 place PE03 (PE01, PE02) handswitch in **OFF** then **AUTO**.
 - 2) The associated valve FCV-E03 (E01, E02) will close.

NOTE: Sump Pumps are not provided with level switches.

6.3.4 Process Building Sump Pump Operation:

- a. At process building sump pump PT02, **OPEN** 2 in.-TLS04-V01.
- b. At MCC-1, check/set handswitch for sump pump PT02 in **OFF**.
- c. At MCC-1, **CLOSE** breaker for PT02.
- d. At MCC-1, place handswitch for PT02 in **HAND** (typically for 10 seconds) then place in **OFF**.
- e. At MCC-1, **OPEN** breaker for PT02.
- f. At process building sump pump PT02, **CLOSE** 2 in.-TSL04-V01.

6.3.5 Stripper Pad Sump Pump Operation:

- a. At stripper pad sump pump PT04 outlet fitting, remove cap and connect transfer hose.

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- b. Route hose to drum inside process building or the process building sump.
- c. At stripper pad sump pump PT04, **OPEN** 2 in. discharge valve.
- d. At stripper pad sump pump PT04, **CLOSE** local disconnect for PT04.
- e. At MCC-1, check/set handswitch for sump pump PT04 in **OFF**.
- f. At MCC-1, **CLOSE** breaker for PT04.
- g. At MCC-1, place handswitch for PT04 in **HAND** (typically for 10 seconds) then place in **OFF**.
- h. At MCC-1, **OPEN** breaker for PT04.
- i. At stripper pad sump pump PT04, **CLOSE** 2 inch discharge valve.
- j. At stripper pad sump pump PT04, **OPEN** local disconnect for PT04.
- k. At stripper pad sump pump PT04, disconnect hose, install cap on sump piping.
- l. Roll and store transfer hose.

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7.0 AUTOMATIC TRIPS AND ALARM RESPONSE PROCEDURES

Table 7-1. MCP Left-Door Alarm Panel.

Label/Drop No.	Trigger	Response
EXTRACT WELL FLOW LOW FAL-E01 (02 ~ 10) [A1 ~ A3] [B1 ~ B3] [C1 & C2] [D1 & D2]	FSL-E01 (through E10)	1. Verify extraction well pump PE01 (02 ~ 10) trips and FCV-E01 (02 ~ 10) closes. Initiate manual trip(s) if necessary.
	<10 gpm	2. Ensure supervisor informed of alarm(s) and investigate cause.
		3. Restore pump(s) and valve(s) operation per supervisor's direction. No auto restart features.
EXTRACT WELL LEAK NA-EWE (D4)	See "Response" column	1. Verify all 200-ZP-1 liquid pumps trip. Initiate manual trips if necessary.
		2. Confirm source of leak as indicated on Leak Detection Status Panel and brief supervisor.
		3. Perform Abnormal Operations Procedure 8.1, "200-ZP-1 System Leak," if necessary or restore system per supervisor's direction.
EXTRACT WELL LVL LOW LAL-WE01 (02 ~ 10) [A5 ~ A7] [B5 ~ B7] [C5 & C6] [D5 & D6]	LSL-WE01 (02 ~ 10)	1. Verify well pump PE01 (02 ~ 10) trips and FCV-E01 (02 ~ 10) followed with closure. Trip and close if necessary.
	<5 ft WE01	2. Ensure supervisor informed of alarm(s) and investigate cause.
	<1 ft others	3. Restore pump(s) and valve(s) operation per supervisor's direction. No AUTO restart feature.
LEAK SYSTEM FAIL (C7)	ANY ALARM FAILURE	1. Ensure that building exhausters are ON. Verify system shuts down automatically. Manually initiate trips, isolations, if necessary.
		2. Verify leak containment by walkdown.
		3. Perform Abnormal Operations Procedure 8.1, or restore system per supervisor's direction.
LEAK SYSTEM MAINTENANCE	NA	1. Information alarm

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Table 7-2. MCP Center-Door Alarm Panel. (Page 1 of 5)

Label/Drop No.	Trigger	Response
EXTRACT FLOW HI/LOW FAHL-TSL01 (A1)	FSHL-TSL01	Disabled
TANK LEAK NA-PT02 (A2)	NE-PT02	1. Ensure that building exhausters are ON. Verify all 200-ZP-1 liquid pumps trip. Initiate manual trips if necessary.
		2. Confirm source of leak and brief supervisor.
		3. Perform Abnormal Operations Procedure 8.1, if necessary or restore system per supervisor's direction.
• AFD-PI01 HIGH PRESSURE SHUTDOWN (A3)	PSH-02 75 psi	1. Verify pump trip and associated control valve closure. Manually trip pump(s) and close valves if necessary.
• AFD-PT01 HIGH PRESSURE SHUTDOWN (B7)	PSH01 75 psi	2. Verify leak containment.
		3. Perform Abnormal Operations Procedure 8.1, or restore system per supervisor's direction.
• AFD-PI01 FAULT (A4)	AFD Module internal fault	1. Verify automatic pump control or manually operate affected pump(s).
• AFD-PT01 FAULT (B8)	AFD Module internal fault	2. Verify leak containment.
		3. Perform Abnormal Operations Procedure 8.1, or restore system per supervisor's direction.
EFFL TANK LVL HI LAHH-T02 (A5)	LSHH-T02 155.6 inches	1. Verify stripper transfer pump PT03 trips. Initiate manual trip(s) if necessary.
		2. Ensure supervisor informed of alarm(s) and investigate cause.
		3. Verify spill containment. If overflow not contained by sump; treat conditions per Abnormal Operations Procedure 8.1 200-ZP-1 System Leak.
		4. Restore system per supervisor's direction. No AUTO restart features.

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Table 7-2. MCP Center-Door Alarm Panel. (Page 2 of 5)

Label/Drop No.	Trigger	Response
EFFL TANK LVL HI LAH-T02 (A6)	LSH-T02 149 inches	1. Respond per alarm drop "A5."
EFFL TANK LVL LO LAL-T02 (A7)	LSL-T02 24 inches	1. Verify injection pump PI01 trips. Initiate manual trip(s) if necessary.
		2. Verify no leakage. If leakage observed, refer to Abnormal Operations Procedure 8.1.
		3. Ensure supervisor informed of alarm(s) and investigate cause.
		4. Restore system per supervisor's direction.
TANK TEMP HI/LO TAHL-T02 (A8)	TSL-T02 High 100° F Low 40° F	1. Confirm valid low temperature (TI-T02 at MCP). If confirmed, stop system injection manually.
		2. Inform supervisor of alarm(s) and investigate cause.
		3. Consider tripping PI01 manually if water temperature becomes excessively high.
		4. Restore system per supervisor's direction. No AUTO restart features.
INFL TANK LVL HI LAHH-T01 (B1)	LSHH-T01A or LSHH-T01B 149 inches	1. Verify extraction well pump(s) trip and corresponding FCVs close.
		2. Verify T01 LCV-TSL01 closes.
		3. Initiate manual trip(s)/closures if necessary.
		4. Ensure supervisor informed of alarm(s) and investigate cause.
		5. Verify spill containment. If overflow not contained by sump, treat conditions per Abnormal Operations Procedure 8.1.
		6. Restore system per supervisor's direction. No AUTO restart features.
INFL TANK LVL HI LAH-T01 (B2)	LSH-T01 145 inches	1. Respond per alarm drop "B1." NOTE: LCV-TSL01 does not close on "HI" water level; only HI-HI requires closure.

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Table 7-2. MCP Center-Door Alarm Panel. (Page 3 of 5)

Label/Drip No.	Trigger	Response
INFL TANK LVL LOW LAL-T01 (B3)	LSL-T01 24 inches	1. Verify influent pump PT01 trips.
		2. Verify no leakage. If leakage observed, refer to Abnormal Operations Procedure 8.1.
		3. Ensure supervisor informed of alarm(s) and investigate cause.
		4. Restore system per supervisor's direction.
TANK TEMP LOW TAL-T01 (B4)	TSL-T01 54° F	1. Verify influent pump PT01 trips (and FCV-TSL02 follows to close). Manually trip and close components if necessary.
		2. Confirm low temperature (TI-T01 at MCP). If confirmed stop injection manually.
		NOTE: <54°F water temperature to stripper V01 reduces stripper efficiency.
		3. Restore system per supervisor's direction. No AUTO restart features.
• FILTER 2 PRESS HI PDAHH-F2 (B5)	PDSHH-F2 30 PSID	1. On HI ΔP, initiate filter replacement per supervisor's direction.
• FILTER 2 PRESS HI PDAH-F2 (B6)	PDSH-F2 20 psid	2. On HI-HI ΔP, verify influent pump PT01 trips (and FCV-TSL02 follows to closure). Manually trip pump(s) and valve(s) if required.
• FILTER 1 PRESS HI PDAHH-F1 (C1)	PDSHH-F1 30 psid	
• FILTER 1 PRESS HI PDAH-F1 (C2)	PDSH-F1 20 psid	3. Initiate appropriate maintenance to restore system per supervisor's direction.
• BLOWER PRESS HI PAH-TSA01 (C3)	PSHL-TSA01 70 inwg	1. Verify blower B01 and influent pump PT01 trip (and FCV-TSL02 follows pump to closure).
• BLOWER PRESS LOW PAL-TSA01 (C4)	PSHL-TSA01 28 inwg	

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Table 7-2. MCP Center-Door Alarm Panel. (Page 4 of 5)

Label/Drop No.	Trigger	Response
STRIPPER LEAK HI NAHH-V01A (C5)	NE-V01A	1. Ensure Bldg exhausters ON. Verify all 200-ZP-1 liquid pumps trip. Initiate manual trips if necessary.
		2. Confirm leak as indicated on leak detection system status panel and brief supervisor.
		3. Perform Abnormal Operations Procedure 8.1, if necessary, or restore system per supervisor's direction.
STRIPPER LEAK HI NAH-V01A (C6)	NE-V01A	1. Confirm leak as indicated on Leak Detection System Status Panel. Brief supervisor of conditions.
		2. Per supervisor direction, prepare and start stripper pad sump pump PT04 as soon as possible to prevent a system trip on HI-HI sump water level.
		3. Restore system per supervisor's direction.
PROCESS LEAK NA-TSL03 (C7)	NE-TSL03A (PT03 outlet piping; below ground)	1. Ensure Bldg exhausters are ON. Verify all 200-ZP-1 liquid pumps trip. Initiate manual trips if necessary.
		2. Confirm leak as indicated on Leak Detection System Status Panel and brief supervisor.
		3. Perform Abnormal Operations Procedure 8.1, if necessary, or restore system per supervisor's direction.

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Table 7-2. MCP Center-Door Alarm Panel. (Page 5 of 5)

Label/Drop No,	Trigger	Response
STRIPPER FLOW HI/LOW FAHL-TSL02 (D1)	FSHL-TSL02 HI 180 gpm LO 100 gpm	1. Verify influent pump trips and corresponding FCV-TSL02 follows pump to closure. Manually trip pump(s) and valve(s) if necessary.
		2. Verify leak containment (stripper high-level dump valve LCV-TSL02 dumps to stripper pad skid on HI-HI level).
		3. Ensure supervisor informed of alarms and investigate cause.
		4. Restore system per supervisor's direction.
STRIPPER LVL HI LAH-V01 (D2)	LSH-V01 92 inches	1. Verify FCV-TSL02 closes and ensure influent pump PT01 trips. Immediately trip PT01 manually if necessary.
		2. Verify leak containment.
		3. Ensure supervisor informed of alarm(s) and investigate cause.
		4. Restore system per supervisor's direction.
STRIPPER LVL LOW LAL-V01 (D3)	LSL-V01 14 inches	1. Verify stripper transfer pump PT03 trips (initiate manual trip(s) if necessary).
		2. Verify leak containment.
		3. Ensure supervisor informed of alarm(s) and investigate cause.
		4. Restore system per supervisor's direction.
• INJECT FLOW HI FAH-I11 (C5)	FSH-I11 200 gpm	1. Abnormal system Δ flow could indicate leakage (FI-TSL01/HS-FITS01 selector). Perform Abnormal Operations Procedure 8.1 if required.
• INJECT FLOW LO FAL-I11 (C6)	FSL-I11 140 gpm	2. Check for equipment malfunctions (e.g., injection pump; level/flow control valves). Ensure supervisor informed of alarms.
		3. Restore system to normal per supervisor's direction.

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Table 7-3. MCP Right-Door Alarm Panel. (Page 1 of 3)

Label/Drop No.	Trigger	Response	
HEATER TEMP HI TAH-H01 (A1)	TE-H01 100° F	1.	Confirm temperature (TI-H01 at the MCP) and brief supervisor.
		2.	Consider system shutdown if temperature excessively high as GAC efficiency will be poor.
		3.	Investigate for cause (e.g., TIC-H01 operation; sufficient air flow through heater unit, heater-chiller malfunction).
		4.	Restore system per supervisor's direction.
INJECTION FLOW LOW FAL-I01 (02 ~ 05) [A4 (B4, C4, D4); A5]	FSL-I01 10 gpm	1.	Confirm low flow (FI-I1/HS-LIFII) and brief supervisor.
		2.	Confirm leak containment.
		3.	Investigate cause (e.g., PI01 malfunction).
		4.	Restore system per supervisor's direction.
INJECTION LVL HI LAH-INJ01 (02 ~ 05) [A6 (B6, C6, D6)]	LSH-I01 200 ft	1.	Confirm high level (LI-I1/HS-LIFII on the MCP) and brief supervisor.
		2.	Investigate cause; consider system shutdown if necessary.
		3.	Restore system per supervisor's direction.
AIR TEMP HI/LOW TAHL-TSA03 (B1)	TSHL-TSA03 HI 100° F LO 40° F	1.	Verify temperature (TI-TSA03 on the MCP) and brief supervisor.
		2.	Consider system shutdown if temperature excessively high as GAC efficiency will be poor.
		3.	Investigate for cause (e.g., TIC-H01 operation; sufficient air flow through heater unit, heater-chiller malfunction).
		4.	Restore system per supervisor's direction or shut down system.

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Table 7-3. MCP Right-Door Alarm Panel. (Page 2 of 3)

Label/Drop No.	Trigger	Response
AIR FLOW HI/LOW FAHL-TSA03 (B2)	FSHL-TSA03	1. Verify chiller-heater shutdown. Initiate manual shutdown if necessary.
	HI 550 cfm	2. Brief supervisor of alarm(s); investigate cause (e.g., blower malfunction).
	LO 300 cfm	3. Restore system per supervisor's direction.
AIR HUMIDITY HI MA-TSA03 (B3)	MSH-TSA03	1. Verify high moisture (MI-TSA03 on the MCP) and brief supervisor of conditions.
	>60 %rh	2. Investigate heater-chiller, and TIC-H01 for proper operation.
		3. Restore system per supervisor's direction or shut down system.
INJECTION LEAK NA-INJ (C4)	NE-I11B	1. Ensure Bldg exhausters are ON. Verify all 200-ZP-1 liquid pumps trip. Initiate manual trips if necessary.
		2. Confirm source of leak and brief supervisor.
		3. Perform Abnormal Operations Procedure 8.1, if necessary or restore system per supervisor's direction.

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Table 7-3. MCP Right-Door Alarm Panel. (Page 3 of 3)

Label/Drop No.	Trigger	Response
CCL4 HI AMBIENT AAH-AE (C5)	ASH-AE >5 ppm	WARNING: If RED lights on 200-ZP-1 Building access doors illuminated and/or RED beacon mounted on associated wall of the MCC/MCP control room is FLASHING, evacuate the building immediately.
		DO NOT ENTER BUILDING WITHOUT INDUSTRIAL HYGIENE APPROVAL.
		1. Notify supervisor and arrange for air sampling.
		2. With the industrial hygiene technician's concurrence, enter the building and access the MCC/MCP control room.
		3. Confirm alarms, and per supervisor's direction, investigate cause and restore system.
CCL4 HI GAC AAH-01 (D2)	ASH-01 35 ppm	1. Confirm alarm and brief supervisor of conditions.
		2. Investigate cause.
		3. Restore system per supervisor's direction, or consider system shutdown if problem cannot be corrected in a timely manner.
<ul style="list-style-type: none"> • VENT FLOW HI FAH-TSA05 (D3) • VENT FLOW LOW FAL-TSA05 (D4) 	FSH-TSA05 550 cfm	1. Verify flow rate (FI-TSA05 on the MCP) and brief supervisor of conditions.
	FSL-TSA05 300 cfm	2. Per supervisor's direction, locally inspect for cause. Be alert for gas leakage and leave building immediately if necessary.
		3. Restore system per supervisor's direction.

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8.0 ABNORMAL OPERATIONS PROCEDURES

8.1 200-ZP-1 System Leak

- 8.1.1 Ensure that system is shut down and supervisor's been briefed (per alarm response procedure).
- 8.1.2 Supervisor to initiate "reporting chain" per BHI-MA-02, ERC Project Procedures, Procedure 2.6, "*Occurrence Investigation and Reporting*", as appropriate.
- 8.1.3 Stop the leak; manually isolate leak from source as necessary.
- 8.1.4 Warn others; direct evacuation of affected area.
- 8.1.5 Minimize the leakage; contain and clean leakage per supervisor's direction to minimize spread.
- 8.1.6 Record leak in the facility operations logbook.

9.0 REFERENCES

BHI-00978, *Site Specific Waste Management Instruction, 200-ZP-1 Pump and Treat System.*

BHI-00826, *200-ZP-1 Phase II and III IRM Groundwater Pump and Tread Site Safety Plan.*

BHI-MA-02, ERC Project Procedures, Procedure 2.6, "*Occurrence Investigation and Reporting.*"

10.0 ATTACHMENTS

- 1. 200-ZP-1 Pump-and-Treat System Valve Checklist
- 2. 200-ZP-1 Pump-and-Treat System Power Supply Checklist
- 3. 200-ZP-1 Pump-and-Treat Daily Routines

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 1 of 10)

Date Complete ____/____/____

Operator _____

Drawing No(s) 0200W-DD-J0037
through J0042

NOTE: Valve lineups may be not applicable (N/A) if the lineup has been verified and documented in another procedure. This can be accomplished by referencing this note with ** and the procedure number in the comments section. Consideration should be given to when the lineup was performed and when maintenance was performed on the system.

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
	#1 Extraction Manifold Bldg.	PE03 Outlet Sample Isolation	C			
	#1 Extraction Manifold Bldg.	FT-E03 Root (Well Pump PE03 Flow)	O			
3 in-E03-V01	#1 Extraction Manifold Bldg.	FT-E03 Inlet Isolation	O			
2 in-E03-V02	#1 Extraction Manifold Bldg.	Manual Throttle Valve	O			
FCV-E03	#1 Extraction Manifold Bldg.	Well Pump PE03 Flow Control	C			
3 in-E03-V04	#1 Extraction Manifold Bldg.	FCV-E03 By-pass	C			
	200-ZP-1 Bldg.	FT-E01 Root (Well Pump PE01 Flow)	O			

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Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
2 in-E01-V02	200-ZP-1 Bldg.	Manual Throttle Valve	O		Downstream of pressure regulator for PE01	
	200-ZP-1 Bldg.	PE01 Outlet Sample Isolation	C			
FCV-E01	200-ZP-1 Bldg.	PE01 Flow Control	C			
3 in-E01-V04	200-ZP-1 Bldg.	FCV-E01 By-pass	C			
	200-ZP-1 Bldg.	FT-E02 Root (Well Pump PE02 Flow)	O			
2 in-E02-V02	200-ZP-1 Bldg.	Manual Throttle Valve	O		Downstream of pressure regulator for PE02	
	200-ZP-1 Bldg.	PE02 Outlet Sample Isolation	C			
FCV-E02	200-ZP-1 Bldg.	PE02 Flow Control	C			
	200-ZP-1 Bldg.	Well Pump Discharge Pressure Indicator Root Valves	O		Typical for three indicators	
3 in-E02 -V04	200-ZP-1 Bldg.	FCV-E02 By-pass	C			
2 in	200-ZP-1 Bldg.	6 in-TSL01 Extraction Piping Flush	C		Not presently installed	
	200-ZP-1 Bldg.	FT-TSL01 Root (Total Well Flow)	O			
LCV-TSL01	200-ZP-1 Bldg.	Influent Tank T01 Level Control	T			
6 in-TSL01-V01	200-ZP-1 Bldg.	LCV-TSL01 Inlet Isolation	O			
6 in-TSL01-V03	200-ZP-1 Bldg.	LCV-TSL01 Outlet Isolation	O			
6 in-TSL01-V04	200-ZP-1 Bldg.	LCV-TSL01 By-pass	C			

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Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
3/4 in	200-ZP-1 Bldg.	LCV-TSL01 Sample/Drain	C			
3/4 in	200-ZP-1 Bldg.	LCV-TSL01 Downstream Vent	C			
5 in	200-ZP-1 Bldg.	T01 Drain	C			
	200-ZP-1 Bldg.	T01 Sample isolation	C		NOTE: One on T01 Drain; one on T01 outlet	
	200-ZP-1 Bldg.	LT-T01 Root (for T01)	O			
6 in-TSL02-V01	200-ZP-1 Bldg.	Influent Pump PT01 Inlet Isolation	O			
	200-ZP-1 Bldg.	PT01 Inlet Strainer Blowdown	C			
6 in-TSL02-V02	200-ZP-1 Bldg.	PT01 Outlet Isolation	O			
6 in-TSL02-V06	200-ZP-1 Bldg.	Influent Filter F-1A Inlet Isolation	O			
6 in-TSL02-V07	200-ZP-1 Bldg.	F-1A Outlet Isolation	O			
6 in-TSL02-V03	200-ZP-1 Bldg.	F-1A By-pass	C			
	200-ZP-1 Bldg.	F-1A Drain	C			
	200-ZP-1 Bldg.	PDT-FI Root (Influent Filter)	O			
	200-ZP-1 Bldg.	PI-F1A Root (Influent Filter)	O			
	200-ZP-1 Bldg.	PI-F1B Root (Influent Filter)	O			
3/4 in	200-ZP-1 Bldg.	PT01 Recirc Line High-vent	C			
6 in-TSL04-V04	200-ZP-1 Bldg.	PT01 Recirc Line Isolation	C			
	200-ZP-1 Bldg.	FT-TSL02 Root (PT01 Flow)	O			
FCV-TSL02	200-ZP-1 Bldg.	PT01 Discharge Valve	C			

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 4 of 10)

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
6 in-TSL02-V08	200-ZP-1 Bldg.	FCV-TSL02 Inlet Isolation	O			
6 in-TSL02-V10	200-ZP-1 Bldg.	FCV-TSL02 Outlet Isolation	O			
6 in-TSL02-V11	200-ZP-1 Bldg.	FCV-TSL02 By-pass	C			
3/4 in	200-ZP-1 Bldg.	FCV-TSL02 Inlet Drain	C			
3/4 in	200-ZP-1 Bldg.	FCV-TSL02 Outlet Vent	C		At associated discharge pipe high-point	
3/4 in	200-ZP-1 Bldg.	FCV-TSL02 Outlet Drain	C			
10 in-TSA01-V01	V01 Pad	B01 Gas Recirculation Inlet Isolation	C			
6 in-TSA01-V02	V01 Pad	B01 Atmospheric Inlet Isolation	O			
	V01 Pad	PI-TSA01 Root (Blower)	O			
	V01 Pad	PI-TSA01 Root (Blower)	O			
	V01 Pad	PSHL-TSA01 Root (Blower)	O			
	V01 Pad	FI-TSA01 Root (Blower)	O			
6 in-TSL07-V01	V01 Pad	Stripper V01 Drain	C			
LCV-TSL06	V01 Pad	V01 High H ₂ O Dump	C			
	V01 Pad	PDI-V01 Root (Stripper)	O			
	V01 Pad	LSLL-V01 Root (Stripper)	O			
	V01 Pad	LT-V01 Root (Stripper)	O			
	V01 Pad	LSHH-V01 Root (Stripper)	O			
6 in-TSL03-V01	V01 Pad	Stripper Transfer Pump PT03 Inlet Isolation	O			

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 5 of 10)

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
	V01 Pad	Transfer Pump PT03 Inlet Strainer Blowdown	O			
6 in-TSL03-V02	V01 Pad	Transfer Pump PT03 Outlet Isolation	O			
		V01 Recirculation Line Isolation	C		Typical for two valves. One at PT03 discharge. The other is on liquid inlet line to stripper. Location is near east side of stripper.	
	V01 Pad	PI-TSL03 Root (PT03 Pressure)	O			
2 in	V01 Pad	Stripper Pad Sump Pump PT04 Outlet Isolation	C			
LCV-TSL03	200-ZP-1 Bldg.	Stripper V01 Level control	T			
6 in-TSL03-V03	200-ZP-1 Bldg.	LCV-TSL03 Inlet Isolation	O			
6 in-TSL03-V04	200-ZP-1 Bldg.	LCV-TSL03 Outlet Isolation	O			
6 in-TSL03-V05	200-ZP-1 Bldg.	LCV-TSL03 By-pass	C			
3/4 in	200-ZP-1 Bldg.	LCV-TSL03 Sample Drain	C			
6 in-TSL04-V05	200-ZP-1 Bldg.	Effluent/Injection Tank T02 Recirc Line Inlet Isolation	C			
5 in	200-ZP-1 Bldg.	T02 Drain	C			
	200-ZP-1 Bldg.	LT-T02 Root	O			
1/2 in	200-ZP-1 Bldg.	T02 Sample Isolation	C			
6 in-I01-V01	200-ZP-1 Bldg.	Injection Pump PI01 Inlet Isolation	O			

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 6 of 10)

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
	200-ZP-1 Bldg.	PI01 Inlet Strainer Blowdown	C			
	200-ZP-1 Bldg.	PI-I01 Root (for PI01)	O			
LCV-I01	200-ZP-1 Bldg.	PI01 Discharge Valve	C			
6 in-I01-V02	200-ZP-1 Bldg.	LCV-I01 Inlet Isolation	O			
6 in-I01-V04	200-ZP-1 Bldg.	LCV-I01 Outlet Isolation	O			
6 in-I01-V05	200-ZP-1 Bldg.	LCV-I01 By-pass	C			
3/4 in	200-ZP-1 Bldg.	LCV-I01 Sample Drain	C			
6 in-I01-V09	200-ZP-1 Bldg.	Injection Filter F-2A Inlet Isolation	Circle O C		Open = on-line; closed = standby	
6 in-I01-V10	200-ZP-1 Bldg.	Injection Filter F-2A Outlet Isolation	Circle O C		Open = on-line; closed = standby	
	200-ZP-1 Bldg.	Injection F-2A Drain	Circle O C		Open = on-line; closed = standby	
6 in-I01-V07	200-ZP-1 Bldg.	Injection Filter F-2B Inlet Isolation	Circle O C		Open = on-line; closed = standby	
6 in-I01-V08	200-ZP-1 Bldg.	F-2B Outlet Isolation	Circle O C		Open = on-line; closed = standby	
	200-ZP-1 Bldg.	F-2B Drain	C			
6 in-I01-V06	200-ZP-1 Bldg.	F-2A(B) By-pass	C			
6 in-TSL04-V01	200-ZP-1 Bldg.	T02/T01 Recirc Line Isolation	C			
3/4 in	200-ZP-1 Bldg.	T02/T01 Recirc Line Drain	C			

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 7 of 10)

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
6 in-I01-V11	200-ZP-1 Bldg.	PI01/Inj. Well Isolation	C			
	200-ZP-1 Bldg.	FT-I11 Root (PI01 Outlet Flow)	O			
6 in-TSL04-V02	200-ZP-1 Bldg.	T02/T01 Recirc Line Isolation	C			
6 in-TSL04-V03	200-ZP-1 Bldg.	T02/T01 Recirc Line Isolation	C			
2 in-TSL04-V01	200-ZP-1 Bldg.	PT02 Outlet Isolation	C			
2 in	200-ZP-1 Bldg.	Process Sump Pump PT02 Drain	C			
10 in-TSA02-V01	200-ZP-1 Bldg.	Chiller C01 Inlet Isolation	O			
½ in-TSL02-V03	200-ZP-1 Bldg.	C01 Cond. Drain	O			
10 in-TSA03-V01	200-ZP-1 Bldg.	Heater H01 Outlet Isolation	O			
	200-ZP-1 Bldg.	FT-TSA03 Root (H01 Outlet)	O			
3/4 in	200-ZP-1 Bldg.	H01 Outlet Sample Isolation	C			
SV-H01	200-ZP-1 Bldg.	Gas Sample (H01 Outlet)	N. D.	N/A		
FCV-H01	200-ZP-1 Bldg.	Gas Sample Flow Control (H-01 Outlet)	T			
SV-AE	200-ZP-1 Bldg.	Ambient-Air Sample Inlet	N.D.	N/A	Ambient = 200-ZP-1 Building air	
FCV-AE	200-ZP-1 Bldg.	Ambient-Air Sample Flow Control	T			
	200-ZP-1 Bldg.	PI-TSA03 Root (GAC Inlet Pressure)	O			
6 in-TSA03-V02	200-ZP-1 Bldg.	"A" Train GAC Inlet Isolation	O			
3/4 in	200-ZP-1 Bldg.	"A" Train Inlet Vent	C			

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Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
	200-ZP-1 Bldg.	"A" Train GAC inlet Isolation Valves (integral with Each GAC Canister)	O			
	200-ZP-1 Bldg.	PI-TSA04 Root	O			
3/4 in	200-ZP-1 Bldg.	"A" Train GAC Vent	C			
SV-V02A	200-ZP-1 Bldg.	Gas-Sample	N.D.	N/A	GAC V02A outlet	
FCV-V02A	200-ZP-1 Bldg.	Gas-Sample Flow Control	T		GAC V02A outlet	
3/4 in	200-ZP-1 Bldg.	"A" Train GAC Vent	C			
SV-V03A	200-ZP-1 Bldg.	Gas-Sample	N.D.	N/A	GAC V03A outlet	
FCV-V03A	200-ZP-1 Bldg.	Gas-Sample Flow Control	T		GAC V03A outlet	
10 in-TSA05-V01	200-ZP-1 Bldg.	"A" Train GAC Outlet Isolation	O			
	200-ZP-1 Bldg.	"A" Train GAC Outlet Isolation Valves (Integral with Each GAC Canister)	O			
6 in-TSA08-V01	200-ZP-1 Bldg.	"B" Train GAC Inlet Isolation	O			
3/4 in	200-ZP-1 Bldg.	"B" Train Inlet Vent				
	200-ZP-1 Bldg.	"B" Train GAC Inlet Isolation Valves (integral with Each GAC Canister)	O			
	200-ZP-1 Bldg.	PI-TSA07	O			
3/4 in	200-ZP-1 Bldg.	"B" Train GAC Vent	C			
SV-V02B	200-ZP-1 Bldg.	Gas-Sample	N.D.	N/A	GAC V02B outlet	
FCV-V02B	200-ZP-1 Bldg.	Gas Sample Flow Control	T		GAC V02B outlet	
3/4 in	200-ZP-1 Bldg.	"B" Train GAC Vent	C			

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Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
SV-V03B	200-ZP-1 Bldg.	Gas Sample	N.D.	N/A	GAC V03B outlet	
FCV-V03B	200-ZP-1 Bldg.	Gas Sample Flow Control	T		GAC V03B outlet	
10 in-TSA06-V01	200-ZP-1 Bldg.	"B" Train GAC Outlet Isolation	O			
	200-ZP-1 Bldg.	"B" Train GAC Outlet Isolation Valves (Integral with Each GAC Canister)	O			
10 in-TSA09-V01	200-ZP-1 Bldg.	"C" Train GAC inlet Isolation	C			
3/4 in	200-ZP-1 Bldg.	"C" Train Inlet Vent				
	200-ZP-1 Bldg.	"C" Train GAC Inlet Isolation Valves (integral with Each GAC Canister)	O			
	200-ZP-1 Bldg.	PI-TSA08	O			
3/4 in	200-ZP-1 Bldg.	"C" Train GAC Vent	C			
SV-V02C	200-ZP-1 Bldg.	Gas-Sample	N.D.	N/A	GAC V02C outlet	
FCV-V02C	200-ZP-1 Bldg.	Gas Sample Flow Control	T		GAC V02C outlet	
10 in-TSA11-V01	200-ZP-1 Bldg.	"C" Train GAC Outlet Isolation	O			
	200-ZP-1 Bldg.	"C" Train GAC Outlet Isolation Valves (Integral with Each GAC Canister)	O			
	200-ZP-1 Bldg.	PI-TSA05 Root ("B" GAC out)	O			
3/4 in	200-ZP-1 Bldg.	Air Outlet Header Vent	C			
10 in-TSA05-V02	200-ZP-1 Bldg.	Treated Air Outlet to Atmosphere Isolation Valve	O			

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ATTACHMENT 1 200-ZP-1 PUMP-AND-TREAT SYSTEM VALVE CHECKLIST (Page 10 of 10)

Valve Number	Location	Description	Req. Cond.	Init(s)	Comments	L
	200-ZP-1 Bldg.	FT-TSA05 Root (GAC ABC)	0			
	200-ZP-1 Bldg.	Gas Analyzer (B&K) Inlet Isolation	0		At B&K manifold (see drawing 0200-DD-J0068)	
	200-ZP-1 Bldg.	Gas Analyzer "Cal-Gas Inlet"	0		At B&K manifold (see drawing 0200-DD-J0068)	
	200-ZP-1 Bldg.	Gas Analyzer "Cal-Gas By-pass"	0		At B&K manifold (see drawing 0200-DD-J0068)	
	Inside Inj. Manifold Bldg.	FT-I01 Root (Inlet Flow to Injection Well INJ01)	0			
3 in-I02-V01	Inside Inj. Manifold Bldg.	INJ01 Isolation Valve	0			
3 in-I02-V02	Inside Inj. Manifold Bldg.	INJ01 Throttle Valve	T			

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 1 of 8)

Date Complete ___/___/___

Operator _____

Drawing No(s) 0200W-DD-E0018

NOTE: Breaker lineups may be N/A if the lineup has been verified and documented in another procedure. This can be accomplished by referencing this note with ** and the procedure number in the comments section. Consideration should be given to when the lineup was performed and when maintenance was performed on the system.

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
800 amp Main	200-ZP-1	Panel PPA Power Supply	On				
PPA-1, 3, 5	200-ZP-1	MCCI Power Supply	On				
PPA-7, 9, 11	200-ZP-1	Chiller C01	On				
PPA-13, 15, 17	200-ZP-1	Unit Heater #1 Northwest	W	C		Local disconnects and thermostat. As required for (W)arm/(C)old weather operation.	
			Off	On			
PPA-19, 21, 23	200-ZP-1	Process Heater H01	On				
PPA-25, 27, 29	200-ZP-1	Unit Heater #2 Northwest	W	C		Local disconnects and thermostat. As required for (W)arm/(C)old weather operation.	
			Off	On			

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 2 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
PPA-31, 33, 35	200-ZP-1	Unit Heater #3 Southeast	W	C		Local disconnects and thermostat. As required for (W)arm/(C)old weather operation.	
			Off	On			
PPA-37, 39, 41	200-ZP-1	Panel LPA Power Supply	On				
PPA-8, 10, 12	200-ZP-1	Unit Heater #4 Southwest	W	C		Local disconnects and thermostat. As required for (W)arm/(C)old weather operation.	
			Off	On			
PPA-20, 22, 24	200-ZP-1	Injection Manifold Bldg. Panel LPB Power Supply	On				
PPA-26, 28, 30	200-ZP-1	Extraction Manifold Bldg Panel LPC Power Supply	On				
LPA-1, 3, 5, 7	200-ZP-1	Receptacles	NA			Operator discretion	
LPA-9, 11, 13, 15, 17	200-ZP-1	Heat Trace	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPA-19, 21	200-ZP-1	Receptacles	NA			Operator discretion	
LPA-23, 25, 27, 28, 29	200-ZP-1	Leak Detection Alarm Panels 1 through 5	On				

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 3 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
LPA-31, 33, 35	200-ZP-1	Subpanel LPA-1 Power Supply	On				
LPA-2, 4, 6, 8	200-ZP-1	Emergency Lighting Power Supply	On				
LPA-10, 12, 14, 16, 18	200-ZP-1	Receptacles	NA			Operator discretion	
LPA-20	200-ZP-1	MCP PLC Power Supply	On				
LPA-22	200-ZP-1	MCP Power Supply	On				
LPA-24	200-ZP-1	MCP MOV Power Supplies	On				
LPA-26	200-ZP-1	Heat Trace	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPA-34, 36	200-ZP-1	#2 North, #1 South Exhaust and Damper Motors	On			Local switches provided for operation	
MCC1 PT01	200-ZP-1	Influent Pump	On				
MCC1 PI01	200-ZP-1	Injection Pump	On				
MCC1 PT02	200-ZP-1	Pump-and-Treat Bldg. Sump Pump	On				
MCC1 PT04	200-ZP-1	Stripper Pad Sump Pump	On				
MCC1 PT03	200-ZP-1	Stripper Transfer Pump	On				

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 4 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.	Init(s)	Comments	L
MCC1 B01	200-ZP-1	Blower	On			
MCC1 PE01	200-ZP-1	Extraction Well Pump #1	On			
MCC1 PE02	200-ZP-1	Extraction Well Pump #2	On			
MCC1 PE03	200-ZP-1	Extraction Well Pump #3	On			
	WE01	Extraction Well Pump #1	NC		Local disconnect	
	WE02	Extraction Well Pump #2	NC		Local disconnect	
	WE03	Extraction Well Pump #3	NC		Local disconnect	
	200-ZP-1	Stripper Transfer Pump PT03	NC		Local disconnect	
	200-ZP-1	Stripper Pad Sump Pump PT04	NO		Local disconnect	
	200-ZP-1	Air Blower B01	NC		Local disconnect	
	200-ZP-1	Chiller C01	NO		Local disconnect	
	200-ZP-1	Heater H01	NC		Local disconnect	
	200-ZP-1	Area Heater UH-1	NC		Local disconnect	
	200-ZP-1	Area Heater UH-2	NC		Local disconnect	
	200-ZP-1	Area Heater UH-3	NC		Local disconnect	
	200-ZP-1	Area Heater UH-4	NC		Local disconnect	

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 5 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
LPA-1 1&3	200-ZP-1	Control Room Heat Pump	NC			LPA-1 Sub Panel	
LPA-1 6	200-ZP-1	B&K Analyzer AC Unit	NC			LPA-1 Sub Panel	
LPA-1 8	200-ZP-1	Heat Trace TSL03	NC			LPA-1 Sub Panel	
LPA-1 9	200-ZP-1	Heat Trace TSA01	NC			LPA-1 Sub Panel	
LPA-1 10	200-ZP-1	Heat Trace TSA02	NC			LPA-1 Sub Panel	
LPC-1	Extraction Manifold Building	Indoor Lighting/Emergency Exit Lights	On				
LPC-2	Extraction Manifold Building	Extraction Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPC-3	Extraction Manifold Building	Outside Door Light	On				
LPC-4	Extraction Manifold Building	Extraction Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPC-5	Extraction Manifold Building	Outside Flood Light	On				

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 6 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
LPC-6	Extraction Manifold Building	Extraction Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPC-7	Extraction Manifold Building	Spare					
LPC-8	Extraction Manifold Building	Extraction Manifold Building Receptacle	On				
LPC-9	Extraction Manifold Building	Extraction Well Pump PE03 Heat Trace	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPC-10	Extraction Manifold Building	Extraction Well Pump PE03 Receptacle	On				
LPC-11	Extraction Manifold Building	Exhaust Fan Damper	On			Local control switches for damper fan operation	
LPC-19	Extraction Manifold Building	Extraction Manifold Heat Trace	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPC-21	Extraction Manifold Building	Extraction Manifold Heat Trace	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 7 of 8)

Breaker Number	Bldg Location	Description	Req. Cond.		Init(s)	Comments	L
	Extraction Manifold Building	Transformer Isolation	NC			Local disconnect	
LPB-1	Injection Well Building	Indoor Lighting/Emergency Exit Lights	On				
LPB-2	Injection Well Building	Injection Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPB-3	Injection Well Building	Outside Door Light	On				
LPB-4	Injection Well Building	Injection Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPB-5	Injection Well Building	Outside Flood Light	On				
LPB-6	Injection Well Building	Injection Manifold Building Heat	W	C		As required for (W)arm/(C)old weather operation	
			Off	On			
LPB-20	Injection Well Building	Spare				Local control switches for damper fan operation	

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ATTACHMENT 2 200-ZP-1 PUMP-AND-TREAT SYSTEM POWER SUPPLY CHECKLIST (Page 8 of 8)

LPB-8	Injection Well Building	Injection Manifold Building Receptacle	On			
LPB-9	Injection Well Building	INJ01 Heat Trace	W	C		As required for (W)arm/(C)old weather operation
			Off	On		
LPB-10	Injection Well Building	INJ01 Receptacle	On			
LPB-19	Injection Well Building	Injection Manifold Heat Trace	W	C		As required for (W)arm/(C)old weather operation
			Off	On		
LPB-21	Injection Well Building	Injection Manifold Heat Trace	W	C		As required for (W)arm/(C)old weather operation
			Off	On		
	Injection Well Building	Transformer Isolation	NC			Local disconnect

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ATTACHMENT 3 200-ZP-1 PUMP-AND-TREAT DAILY ROUTINES (Page 1 of 3)

200-ZP-1 Pump and-Treat Daily Routines (Page 1 of 3)		Logbook No.: Operator: Date: Time:
Instrument (MCP/PLC)	Reading	Comments
Extraction Well #1 (#2, #3) LI-E1	Well #1 _____ ft Well #2 _____ ft Well #3 _____ ft	
Extraction Well #1 (#2, #3) FI-E1	Well #1 _____ gpm Well #2 _____ gpm Well #3 _____ gpm	
200-ZP-1 Total Inlet Flow FI-TSL01	Total Inlet _____ gpm	
200-ZP-1 Total Outlet Flow FI-I11	Total Outlet _____ gpm	
Influent Tank TI-T01	T01 Temp _____ °F	
Effluent/Injection Tank TI-T02	T02 Temp _____ °F	
Influent Tank LIC-T01	T01 Level _____ Inch	
Influent Filter PDI-F1	F-1A DP _____ psid	If ΔP is nearing 30 PSID, replace filter cartridges.
Influent Pump Outlet FIC-TSL02	PT01 flow _____ gpm	
Stripper V01 LIC-V01	V01 Level _____ Inch	
Effluent/Injection Tank T02 LIC-T02	T02 Level _____ Inch	
Injection Pump Filter PDI-F2	F-2A ΔP _____ psid F-2B ΔP _____ psid	Mark Standby Filter N/A If ΔP is nearing 30 PSID, replace filter cartridge(s).
Injection Well #1 FI-I1	Flow _____ gpm	

Circle off-normal readings in red and notify supervisor.

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ATTACHMENT 3 200-ZP-1 Pump-and-Treat Daily Routines (Page 2 of 3)

200-ZP-1 Pump-and-Treat Daily Routines (Page 2 of 3)		Logbook No.: Operator: Date: Time:
Instrument (MCP/PLC)	Reading	Comments
Injection Well #1 LI-I1	Level_____ft	
Chiller Outlet TI-C01	Temp_____°F	
Heater Outlet TI-TSA03	Temp_____°F	
Heater Outlet MI-TSA03	RH_____%	RH = relative humidity.
GAC Influent Air Flow FI-TSA03	Flow_____cfm	
GAC Effluent Air Flow F1-TSA05	Flow_____cfm	
Stripper Transfer Pump PI-TSL03	Press._____psig	(For PT03).
Filter Inlet PI-F1A	Press._____psig	(For PT01)
Injection Pump PI-I01	Press._____psig	(For PI01).
GAC Inlet PI-TSA03	Press._____psig	
GAC Outlet PI-TSA05	Press._____psig	
GAC V02A Outlet PI-TSA04	Press._____psig	If in STANDBY, mark N/A.

Circle off-normal readings in red and notify supervisor.

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ATTACHMENT 3
200-ZP-1 Pump-and-Treat Daily Routines
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200-ZP-1 Pump-and-Treat Daily Routines (Page 3 of 3)		Logbook No.: Operator: Date: Time:
Instrument (MCP/PLC)	Reading	Comments
GAC V02B Outlet PI-TSA07	Press. _____ psig	If in STANDBY, mark NA.
GAC V02C Outlet PI-TSA08	Press. _____ psig	If in STANDBY, mark NA.
Well Pump Pressure Regulators	REGULATED PRESSURE _____ REGULATED PRESSURE _____ REGULATED PRESSURE _____	Pressure indicators installed with regulators.
Stripper V01 Differential Pressure indicator PDI- V01	Δ Press. _____ in. H ₂ O	
Gas Analyzer A-H01	ppm _____	CCl ₄ (carbon tetrachloride). PLC electronic trace-use INTOUCH.

Circle off-normal readings in red and notify supervisor.